

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): A method for producing a steel alloy with retained austenite comprising the acts of:

- providing a steel alloy having a significantly elevated silicon level;
- annealing, following said step of providing, said steel alloy at an annealing temperature to produce initial austenite in said steel alloy;
- quenching, following said step of annealing, said steel alloy [[at]]to a quenching temperature to transform a portion of said initial austenite into create controlled amounts of martensite and to leave remaining austenite that is less than said initial austenite, said quenching temperature (QT) satisfying a condition of

$$50^{\circ}\text{C} \leq M_s - QT = \left[539 - 423 \left[\frac{-AT(^{\circ}\text{C}) + 910 - 15.2Ni + 44.7Si + 104V + 31.5Mo + 13.1W}{203} \right]^2 - 30.4Mn - 12.1Cr - 17.7Ni - 7.5Mo - QT \right] \leq 250^{\circ}\text{C}$$

where M_s is a martensite start temperature, where AT is the lower of the annealing temperature and a full austenitization temperature for the steel alloy, Ni is a nickel by weight percentage, Si is a silicon by weight percentage, V is a vanadium by weight percentage, Mo is a molybdenum by weight percentage, W is a tungsten by weight percentage, Mn is a manganese by weight percentage, and Cr is a chromium by weight percentage;

carbon partitioning, following said step of annealing, said steel alloy to transfer carbon from said martensite to said remaining austenite sufficient to produce stable or metastable retained austenite and carbon-depleted martensite; and
cooling, following said step of carbon partitioning, said steel alloy to a desired temperature.

Claim 2 (Original): A method, as claimed in claim 1, wherein:
said step of providing comprising providing a low-carbon steel alloy.

Claim 3 (Original): A method, as claimed in claim 1, wherein:
said step of annealing comprising placing said steel alloy at a temperature greater than a temperature for full austenization.

Claim 4 (Original): A method, as claimed in claim 1, wherein:
said step of annealing comprising placing said steel alloy at an intercritical temperature that is at or above the temperature at which austenite begins to form and below the temperature for full austenization.

Claim 5 (Original): A method, as claimed in claim 1, wherein:
said step of quenching comprising placing said steel alloy at a temperature below the temperature at which martensite starts to form.

Claim 6 (Canceled)

Claim 7 (Original): A method, as claimed in claim 1, wherein:
said step of carbon partitioning comprising placing said steel alloy at a temperature at which there is carbon mobility.

Claim 8 (Original): A method, as claimed in claim 1, wherein:

said step of carbon partitioning comprising placing said steel alloy at a temperature above which martensite starts to form.